

BIOLOGICAL EVALUATION  
Spruce Budworm Infestation

National Forest, Indian, State,  
and Private Lands

Region 3

1966

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The spruce budworm is currently infesting about 440,000 acres of mixed-conifer forests in Region 3. This is a decrease of 30,000 acres since last year. An egg mass survey was conducted during August and September on 22 sample plots to evaluate population trends of the budworm. The sample plots were located in six widely separated units (see map). The Glenwood Unit on the Gila National Forest was not sampled this year. This unit was dropped from the evaluation because foliage samples taken in 1964 and 1965 did not contain egg masses and because budworm feeding was not evident during this year's aerial survey of the unit.

The budworm population was most active on the Taos, Cloudcroft, and Eagle Nest Units. In these areas, the budworm is expected to cause light to heavy defoliation in 1967.

Control measures against the budworm are not recommended for 1967.

General Information

Insect - Spruce budworm, Choristoneura fumiferana (Clem.)

Hosts - Douglas-fir, Pseudotsuga menziesii (Mirb.) Franco  
White fir, Abies concolor (Gord. & Glend.) Lindl.  
Corkbark fir, Abies lasiocarpa var. arizonica (Merriam) Lemm.  
Blue spruce, Picea pungens Engelm.  
Engelmann spruce, Picea engelmannii Parry

Defoliation Standards - Light, 0 to 25% new growth defoliated  
Moderate, 26 to 50% new growth defoliated  
Heavy, 51 to 75% new growth defoliated  
Severe, 76 to 100% new growth defoliated

Entomological UnitsEagle Nest -

Location: State and private land, east of the Carson National Forest.

Extent: 230,000 acres infested; a decrease of 20,000 acres.

1966 Defoliation: Generally moderate.

Damage: Severe top-injury and some top-killing occurred in localized areas.

Chama -

Location: Private land, west of the Carson National Forest.

Extent: 40,000 acres infested; a decrease of 20,000 acres.

1966 Defoliation: Light.

Damage: Insignificant for the past 3 years. *in the past*

Taos -

Location: Almost entirely within the Eastern Division of the Carson National Forest.

Extent: About 80,000 acres infested; an increase of 30,000 acres.

1966 Defoliation: Light to moderate.

Damage: Some reproduction deformed; spots of top-kill in overstory.

Santa Fe -

Location: Western Division of the Santa Fe National Forest.

Extent: No noticeable infestation.

1966 Defoliation: None.

Damage: None.

Cloudcroft -

Location: Lincoln National Forest and adjacent Mescalero Indian Reservation.

Extent: 90,000 acres infested. No change since 1964.

1966 Defoliation: Generally moderate.

Damage: Reproduction killed and deformed in localized areas. No significant damage in overstory.

Navajo Indian Reservation -

Location: Chuska Mountains, Navajo Indian Reservation.

Extent: No noticeable infestation.

1966 Defoliation: None.

Damage: None.

Sampling Method

A sample plot consisted of five dominant or codominant Douglas-fir trees. Two men, using a 30-foot pole with pruning saw, removed two lower midcrown branches. Foliage from one side of each branch was clipped and discarded. The remaining foliage was then placed in a triangle, measured, and placed in numbered cotton bags. Thus, the equivalent of one entire branch per tree, or five branches per plot, was sampled.

A total of 188,427 square inches of foliage was examined from 22 plots, for an average of about 8,565 square inches per plot. Needles with spruce budworm egg masses were removed from the foliage and tallied by plot. The egg masses were then grouped as old or new. The new egg masses were then examined for egg parasitism.

Results and Discussion

Population trends are determined by comparing the number of 1966 new egg masses with the number of 1965 new egg masses. The data are given in Table 1 for each of the 22 plots sampled. Some plot names were changed this year to make the plot name more descriptive of the area sampled. Where a name was changed, the name used in 1965 is given in Table 1 in parenthesis. Damage estimates for 1967 are based on the number of 1966 egg masses.

Table 1. Summary of 1965 and 1966 Spruce Budworm Egg Mass Survey Data from 22 Douglas-fir Sample Plots in Region 3.

	1965	1966	1966
<u>Eagle Nest Unit</u>			
Cyphers Mine	Not Sampled	6.3	0.2
Garcia Peak	1.3	3.6	0.0
State Wildlife Area	7.3	13.8	0.0
<u>Chama Unit</u>			
Brazos Box	11.6	3.8	0.5
<u>Taos Unit</u>			
**Upper Arroyo Hondo	14.8	1.1	0.0
**Middle Arroyo Hondo	Not Sampled	15.5	0.3
**Lower Arroyo Hondo	18.5	12.1	0.5
**Upper Capulin Canyon (Capulin Peak)	0.2	5.4	0.2
**Lower Capulin Canyon (Capulin Canyon)	3.7	2.1	0.1
**Rio Pueblo (Simpson Canyon)	7.2	29.4	0.3
Garcia Park	Not Sampled	0.2	0.0
Palo Flechado Pass	Not Sampled	0.2	0.0
Rio Chiquito	Not Sampled	0.0	0.0
Pioneer Creek	Not Sampled	10.6	0.1
<u>Santa Fe Unit</u>			
Blue Bird Mesa	0.0	0.0	0.0
Clear Creek	0.0	0.0	0.0
<u>Cloudcroft Unit</u>			
Sacramento Lookout	14.9	3.1	0.1
Nelson Canyon	2.8	11.9	0.2
Mescalero Indian Reservation	0.0	0.0	0.0
<u>Navajo Indian Reservation Unit</u>			
Roof Butte	0.1	0.1	0.0
Roof Butte Burn	0.4	0.0	0.0
Washington Pass	0.0	0.0	0.0

\* The following standard developed by the Rocky Mountain Forest and Range Experiment Station depicts the relationship between egg mass densities in August and defoliation the next year. The standard is for New Mexico and Colo.

Egg Masses Per Thousand Sq. In. of Foliage	Defoliation Percent
1	5
2	10
3 to 5	25
6 to 10	50
11 to 16	75
17 to 20	90
21 or more	95 to 100

\*\* These plots are located within the area treated with malathion in 1966.



Egg parasitism increased in 1966. Last year, parasitism was found in only one plot -- this year in 10 plots. The parasitism that did occur is generally too low to have any overall effect on the 1967 budworm population. However, parasitism may be an important factor contributing to the budworm decline on the Chama Unit. On the Brazos Box plot, there were 0.5 parasitized egg masses per 1,000 square inches of foliage. This represents 12 percent of the new egg masses collected.

Eagle Nest Unit - Egg mass densities increased again on this unit, but only on the State Wildlife Area did they reach the high levels of 1964. Defoliation next spring is expected to be moderate to heavy.

Chama Unit - The budworm population in most of the Chama Unit returned to endemic levels by 1965, except in the Brazos Box area where the infestation remained moderate. Egg mass densities decreased sharply in 1966. Parasitism (12 percent) is apparently an important factor in the continuing decline. Light defoliation is predicted for the Brazos Box in 1967.

Taos Unit - A new and virulent infestation of budworm was discovered on this unit in 1965. The infested area, about 70,000 acres, was treated in June 1966 with low volume malathion. The treatment was not successful. Egg mass counts from plots within the treated area remain high. The infestation has not apparently spread south of its 1965 boundary -- the Rio Fernando de Taos. It has, however, spread north into the Cabresto Creek and Red River drainages. In 1967, defoliation is expected to be light to moderate in the Cabresto Creek and Red River drainages, heavy in the area from Arroyo Hondo to Rio Pueblo, and light to moderate in the area between Rio Pueblo and Rio Fernando de Taos.

Santa Fe Unit - The budworm apparently remains endemic on this unit. Some detection reports of budworm were received this year from the Cuba Ranger District. Areas having a history of spruce budworm infestations were sampled. No egg masses were found. No noticeable defoliation is expected in 1967.

Cloudcroft Unit - Since 1963, when the budworm infestation was discovered on the Lincoln National Forest, the infestation has been characterized by a shifting budworm population. A shift occurred again this year. Egg mass densities from the vicinity of Sacramento Lookout declined sharply, while those in the Nelson Canyon area increased sharply. Defoliation is expected to be light to moderate with the understory trees in the Nelson Canyon area sustaining heavy defoliation.

Navajo Indian Reservation Unit - The budworm is apparently endemic on this unit. No noticeable defoliation is expected in 1967.

### Conclusions

The expanding infestation on the Taos Unit remains the most serious budworm problem in the Region. Last year it was feared that the infestation would spread south of the Rio Fernando de Taos and reinfest areas treated in 1962. The southward spread did not occur; instead the infestation has spread north of Rio Hondo into the Red River and Cabresto Creek drainages. In these newly infested areas of the Taos Unit, defoliation will range from light to moderate in 1967. In the older infested areas of the unit, defoliation will be generally heavy.

Spruce budworm populations remained fairly static on the Eagle Nest and Cloudcroft Units and decreased on the Chama Unit. Budworm populations remain at endemic levels on the Santa Fe Unit and the Navajo Indian Reservation Unit.

Control efforts against the spruce budworm in Region 3 are not recommended at this time.

# BIOLOGICAL EVALUATION SPRUCE BUDWORM INFESTATION NATIONAL FOREST AND ADJACENT INDIAN, STATE, AND PRIVATE LANDS ARIZONA & NEW MEXICO

1966

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